Chapter 2: Parkway Planning and Project Management

Context-sensitive solutions for parkways result from designs sensitive to the local setting and result in "transportation facilities (that) fit their physical setting and preserve scenic, historic, aesthetic, community and environmental resources to the extent possible." The parkway planning and management process involves many offices and divisions within DCR and other state, local and federal agencies as well as the general public. The purpose of this chapter is to outline the planning and management process in detail and identify the responsibilities of each player in parkway project implementation.

The MassHighway *Project Development & Design Guide* (2006) is an example of how the Commonwealth is integrating natural resources, historic properties, and community character into the transportation planning and design process. These parkway guidelines are intended to complement and build upon the MHD process and focus on the specific needs of parkways.

Project Thresholds

The following planning process is designed for larger projects that have the potential to alter the character of a historic parkway. A comprehensive assessment and design process should be undertaken for any contemplated action that might:

- Alter the way a parkway currently functions (speed, capacity or safety),
- Introduce new elements such as signage, traffic control, grade separation, incompatible landscape features, lighting or signals,
- Affect the balance among users (bicyclists, pedestrians and vehicles), and
- Result in the removal, rehabilitation or reconstruction of a significant historic feature such as a bridge, lighting or landscape features.

Maintenance and in-kind replacement activities do not normally require an extensive planning process. These include:

- Re-surfacing,
- Re-striping,
- Catch basin reconstruction (in site, in-kind),
- Replacement of existing sign(s),
- Sidewalk repair, and
- Minimal landscape work (limited tree removal or replacement)

However, whatever the project's magnitude, each DCR project should be developed and specified in accordance with the treatment guidelines in Chapter 3 of this document and carried out in compliance with all regulatory requirements.

PROJECT PLANNING

At the beginning of a parkway project, the Project Manager leads the following internal planning process to determine the scope, regulatory and other planning needs related to the project.

Assess Problem/Need/Opportunity

DCR staff assesses the need for capital investment in historic parkways and associated structures such as bridges or culverts through the annual capital planning process. Some projects are designated by specific legislative authorization. Once a capital need is identified, Planning & Engineering (P&E) submits the project for consideration for the DCR capital plan. When the project is funded or authorized, P&E senior staff assigns the Project Manager.

Identify Project Manager and Project Team

When a project is approved on the capital spending plan, the DCR Bureau of Project Design and Management assigns a Project Manager. The manager prepares a draft scope of work, schedule and budget.

National Park Service Definitions and Corresponding Engineering Terms

Scope of work	NPS treatment	MHD Treatment
Resurfacing and pavement repair within existing footprint; pruning of trees, painting fences and guardrail	Preservation	3R
Replacement of failed lighting, guardrail or other small scale features	Rehabilitation if carried out according to the *Secretary of the Interior's Standards*	3R
Minor widening, reinforcement of shoulders,	Rehabilitation if carried out according to the *Secretary of the Interior's Standards*	3R
Minor alterations to vertical grades and horizontal curves, bridge repair, minor drainage improvements, and removal or protection of roadside obstacles.	Rehabilitation if carried out according to the *Secretary of the Interior's Standards*	3R
Changes within an existing road's general right-of-way corridor for capacity and safety purposes, such as reconfiguring lanes, traffic controls, and modifying a roadway's horizontal and vertical alignment.	Not applicable; Major changes to character-defining features would not be consistent with the SOI Standards	Reconstruction
Repairing a bridge or other feature to a specific period of time, stripping away later changes and carefully reconstructing missing features (i.e. railings, lighting, etc.)	Restoration	3R (?)
Building a DCR roadway using parkway design standards	Not a preservation treatment	New construction

Ideally the scope of work identifies one type of treatment for an entire project. However, it may be necessary to select a combination of treatment types to address existing conditions and management goals, identifying higher levels of preservation for the most significant historic features. Work on a Connecting Parkway may be mostly rehabilitation, but may also include the restoration of a historic pedestrian bridge or overlook. It is essential that the project team avoid confusion over the type of treatment.

National Park Service Treatment Definitions
The following definitions are a taken from Landscape Lines 16: Historic Roads published by the National Park Service.

Preservation retains the existing character and fabric of the historic park road landscape with the highest possible degree of integrity in regard to materials, setting, design, feeling and location. Preservation-based treatment plans typically emphasize maintenance and stabilization regimes aimed at ensuring the longevity of existing features. Measures may be taken to protect and stabilize historic road resources, and limited and sensitive upgrading of technical systems is permissible, but distinctive materials, features and design elements should not be substantially altered or replaced. When original features or materials have deteriorated to the point that they compromise the historic character of safety of the site, limited replacement-in-kind is permitted.

Rehabilitation aims to protect the essential character of the park road landscape while accommodating compatible uses that may require modest alterations to the resource's physical fabric and design qualities. Rehabilitation allows for replacement of deteriorated features on a wider scale than preservation-based treatments, along with more extensive substitution of compatible materials designed to meet current needs. Because rehabilitation-based treatment plans respond to current demands while safeguarding key historic values, they often provide the most acceptable means of resolving the inherent tensions of park road stewardship. The primary challenge in devising rehabilitation strategies is to identify character-defining features and ensure that planned alterations do not compromise the road's overall historic character.

Restoration focuses on returning a historic road to its appearance during the period of significance. This process may include the reconstruction of damaged or missing features and the removal of elements from other eras that detract from the historic scene. Limited upgrading of technical systems is permitted as long as these interventions are discreet and compatible. Existing features from the period of significance will be retained and stabilized. All changes should be carefully researched and specified to ensure that they are historically accurate in regard to design, materials and overall impression. A long-term management plan should be devised to maintain the desired historical appearance.

Reconstruction is the process of recreating a non-surviving site, structure, feature or landscape. This approach should only be employed when the non-surviving resource is deemed exceptionally significant and sufficient documentary evidence exists to ensure an accurate replication of the historical antecedent. Because of the inherent technical challenges and philosophical implications, reconstructions require extensive consideration and high-level review. If reconstruction is deemed a suitable strategy, the artificial nature of the landscape should be explicitly identified and interpreted.

General Treatment Considerations

To select a treatment for a parkway, it is important to understand its dual function as a multi-modal transportation corridor and a historically significant and scenic route in a parkland setting. The MassHighway *Project Development & Design Guide* (2006) actively promotes collaboration between design and preservation professionals to address the dual functions. The guidelines address issues not only road features, but also the setting and how the surrounding corridors and communities affect the character of a road. This "context sensitive design" is integral to the parkway design process.

To develop the plan for a historic parkway project, the Project Team needs to take into account many factors, specifically the following:

- historic value of the parkway, significance and the existing level of documentation,
- integrity - existing condition evaluated against historical significance and defining features,
- management goals for the parkway and
- significance of setting

In choosing the treatment, the following factors should be considered:

- enhancement of historic and cultural features,
- protection of scenic and aesthetic features,
- functional classification of the roadway,
- traffic characteristics—traffic volume, level of service, composition of traffic, speed
- regional transportation—patterns and impacts
- management and sustainability – should reduce the maintenance burden.

Choose disciplines
The Project Team also advises on the composition of the consulting Design Team. The range of possible consulting disciplines needed to address the scope and environmental impacts includes history/historic preservation, landscape architecture, planning, transportation planning and engineering, arboriculture, horticulture, architecture, archaeology, ecology and biology.

Scope out regulatory strategy
The Project Team identifies significant cultural and natural resources and compiles a preliminary list of anticipated regulatory requirements.

Identify public participation
Parkways are important public open spaces that serve a wide range of communities, from residents to commuters to recreational users. A collaborative public process leads to better context sensitive design, construction and management. The public learns about a parkway's historic and environmental and transportation values. The process provides a forum for important advice, commentary and review and can build public support and enthusiasm.

The Project Team develops a preliminary plan for public participation including written materials, meetings, and use of the internet. The DCR Office of External Affairs is the lead organizing public outreach and meetings.

A typical public outreach strategy includes four public meetings - first, a listening meeting; second, a discussion of alternatives; third, the presentation of the preferred alternative and fourth, pre-construction.

Required public meetings and preparation of meeting materials (agendas, graphics, presentation slides) are outlined in the scope for consultant services.

Select Mapping and Data Standards

Every project requires baseline mapping and data collection. The extent and detail of that data depends on the project needs and budget. Whenever possible, parkway projects should incorporate the collection of geographic data in a form consistent with the standards of MassGIS and the DCR GIS Program. Consistent parkway data builds the DCR database.

Determine Scope for Mapping and Data

The Project Manager consults with the GIS Director early in the planning process to identify the appropriate scope for data and mapping. Depending on the goals for the project and existing data on file, the project may require mapping as simple as centerline delineation or as extensive as GPS mapping of parkway features.

Executive Office of Transportation Database

For most parkways, DCR and its consultants use the Executive Office of Transportation's (EOT) GIS data for the centerline locations. If the project requires further mapping, additional data can be collected and stored either in added fields or in separate tables that can be joined to the main attribute table. New data must follow the identical attributions to those of the EOT data. Some projects require additional data such as parkways omitted from the EOT data, sites for which there are location errors in the EOT data, projects requiring line data for individual lanes, and projects where the scale of the EOT data is not sufficiently large.

Traditional Boundary Survey

A traditional boundary survey determines limits of work, relationships among features, etc. Typical survey standards apply for parkway boundaries, and a stamped survey in both printed and digital formats is required. The survey is accompanied by a description of the boundary courses using metes and bounds in either a text document or preferably in a spreadsheet. If the boundary of a parkway is more conceptual than legal (a historic parkway through a state forest where both the forest and the road are state owned) survey standards may not apply and a more approximate location of the boundary can be created using GIS or CAD. If CAD is used then follow the CAD specifications under the heading "Features Associated with Parkways."

Features Associated with Parkways – Database Development

Historic parkway planning requires the identification and location of features such as catch basins, sidewalks, street trees, street lights, traffic signals, crosswalks, signs, etc. In GIS, these features may be defined in terms of points, lines and polygons. Collection of these data in CAD must be in a format that allows DCR to geo-reference the data, tying the information into land coordinates and the GIS mapping database. Additionally, the scale of the data must be explicitly stated (e.g. 1:25,000). This scale represents the best scale at which the data may be used. It is not necessarily the same as the scale placed on a base plan.

If a parkway project includes collection of data, the preferred formats are (in order of preference):

- GIS data with corresponding metadata (or suitable description of collection process/ assumptions)
- AutoCADD data with a world file or known global coordinates included in the file
- Linear referencing involving stations with necessary offsets

For all of these formats, a features list in Excel format can be used to tie tabular attribute data to the mapping system. In all cases, a key (unique) field is required to discern among the individual records. If the data is not in a GIS format, the paper and digital drawings must have labels on each individual feature with the value (character or number) from the key field.

General DCR Standards for Data and Mapping

GIS Data
All data adhere to state data standards set by MassGIS and specific data needs established by the DCR GIS program. All created data need an associated metadata file. Data are in the North American Datum 1983 (NAD83), registered to the Massachusetts State Plane Coordinate System, Mainland Zone (fipszone 2001) and data units will be in meters. MassGIS data documentation standards can be found at http://www.mass.gov/mgis/standard.htm. The DCR GIS Director establishes State data needs for each project (scale and attributes) during the course of the project. Some data may need to be collected with GPS while others may be digitized using existing paper maps or imagery. Known data needs for parkways are: Centerline, Light Posts, Site Furniture, Scenic Overlooks, Paths/Trails, Significant Vegetation (including street trees). All data are delivered in shapefile or personal geodatabase format.

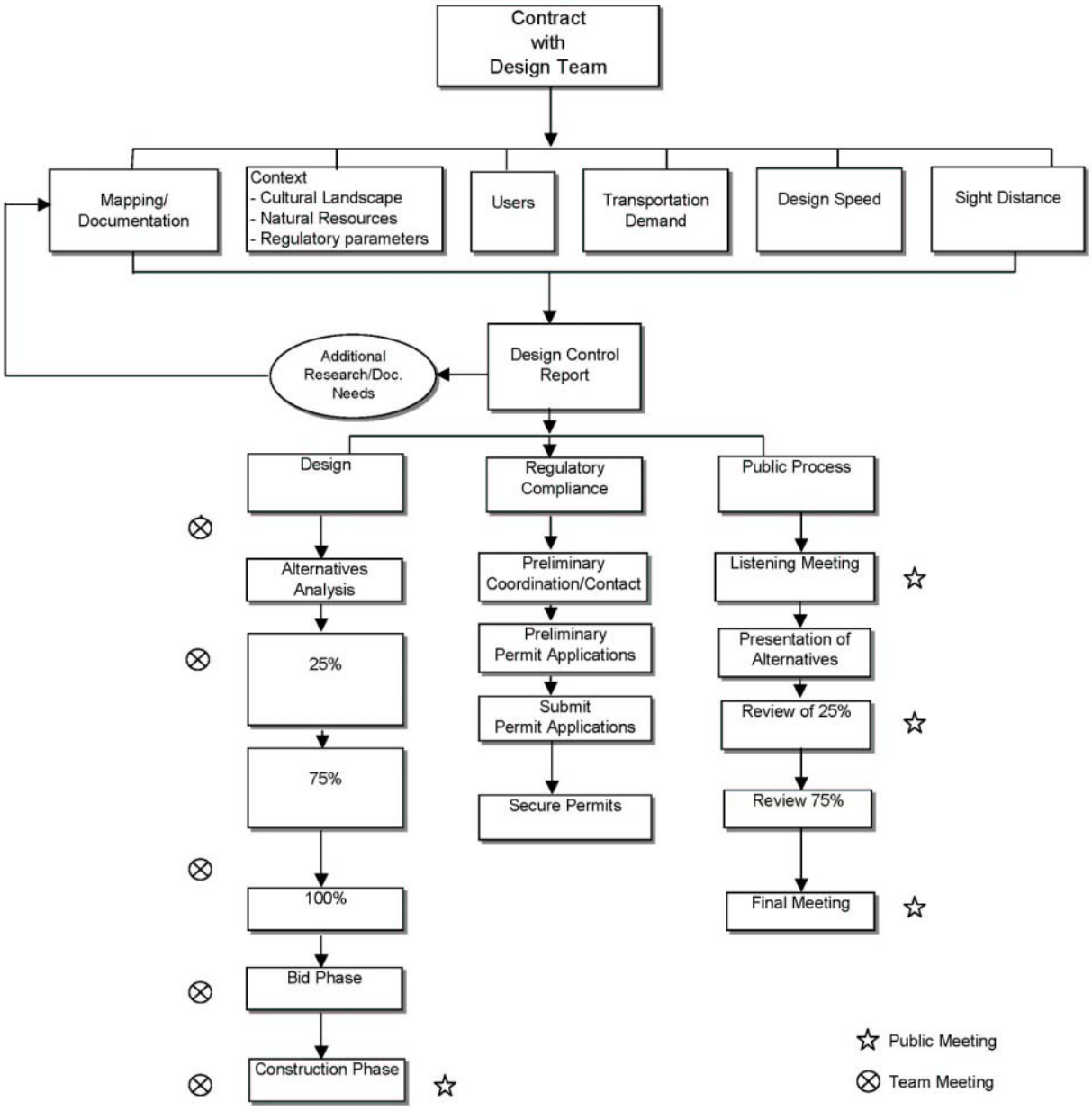
Mapping
Maps are needed both for meetings during the planning process and for inclusion in the final project documents (Design Control Report and Bid Documents). Maps contain all necessary cartographic elements (title, legend, scale, North arrow, etc.) and may need to be produced in both electronic and printed versions.

The Project Manager works with the GIS director to determine whether datasets for any features to be mapped such as catch basins already exist. All new data must match the existing attributes, with data added either in additional fields or as tables that can be joined to the original table based on a key field. If there is no existing DCR data standard for the feature in question, the project manager, GIS director and any other parties relevant to that feature type will establish a standard. Similar decisions need to be made as to whether the data is stored as a point, line or polygon if the geometry is not already determined by existing DCR data.

Procure consultant services
When the Project Team recommends the use of consultant services, the Team indicates the specialized skills or expertise required for the project. The consultant team usually is multidisciplinary. If all the required disciplines are not available within a single firm, then the consultant acts as the prime consultant with one or more subconsultants who cover various specialties. This multidisciplinary consultant group is referred to as the Design Team.

For small projects with an estimated construction cost under $1 million, it may be appropriate to employ master service agreements in place with planning, architectural, landscape architecture and engineering firms. For larger scale projects, the DCR team develops a Request for Response and solicits proposals according to the standard procurement process. It is important to allow for several weeks in the project schedule for the procurement of design services, whether through a

HISTORIC PARKWAYS TREATMENT DESIGN PROCESS



master agreement or RFR process. The Project Manager oversees the procurement process, with input from the Project Team.

Once the Project Team has selected a Design Team, the design process begins with the determination of Design Controls.

DESIGN CONTROLS

The process begins with a comprehensive assessment of the historic parkway and the creation of the guiding design document, the Design Control Report.

Developing the Design Control Report

Baseline parkway documentation
The design team begins with a base survey of the parkway in electronic form. Documentation work includes:

- Available information including National Register nominations, DCR Plans library and other relevant materials.
- Team site visit and identification of elements and issues by each discipline.
- Written, graphic and photographic data organized on forms for each discipline in a consistent manner covering the details and issues that need to be assessed. These long stretches of land are a challenge for efficient, clear documentation.
- Panoramic photos of the landscape and views, as well as photos of specific elements for study.
- Station points on the survey as reference markers so that photographs can be keyed easily and communication among team members is facilitated. If the parkway runs within non-DCR owned lands, include the parkway right-of-way.

Assessment, Documentation and Analysis of Basic Design Controls
Basic design controls serve as the foundation for establishing the physical form, safety and functionality of the parkway. In this manual, the design controls parallel those of MassHighway's *Project Development and Design Guide* as follows:

Roadway Context
Roadway Users
Transportation Demand
Measures of Effectiveness
Speed and
Sight Distance.

Context is the most important design control for a parkway treatment. As stated in *Flexibility in Highway Design*, "One of the greatest challenges the highway community faces is providing safe, efficient transportation service that conserves, and even enhances the environmental, scenic, historic and community resources that are so vital to our way of life."1

The design controls relating to Roadway Users, Transportation Demand, and Speed likewise call for distinctive treatment that distinguishes parkways from other roads. The design controls are not determined in isolation from one another; the values of one will influence those of another. The selection of appropriate values and characteristics for these basic design controls is essential to achieve a safe, effective and context-sensitive appropriate design.

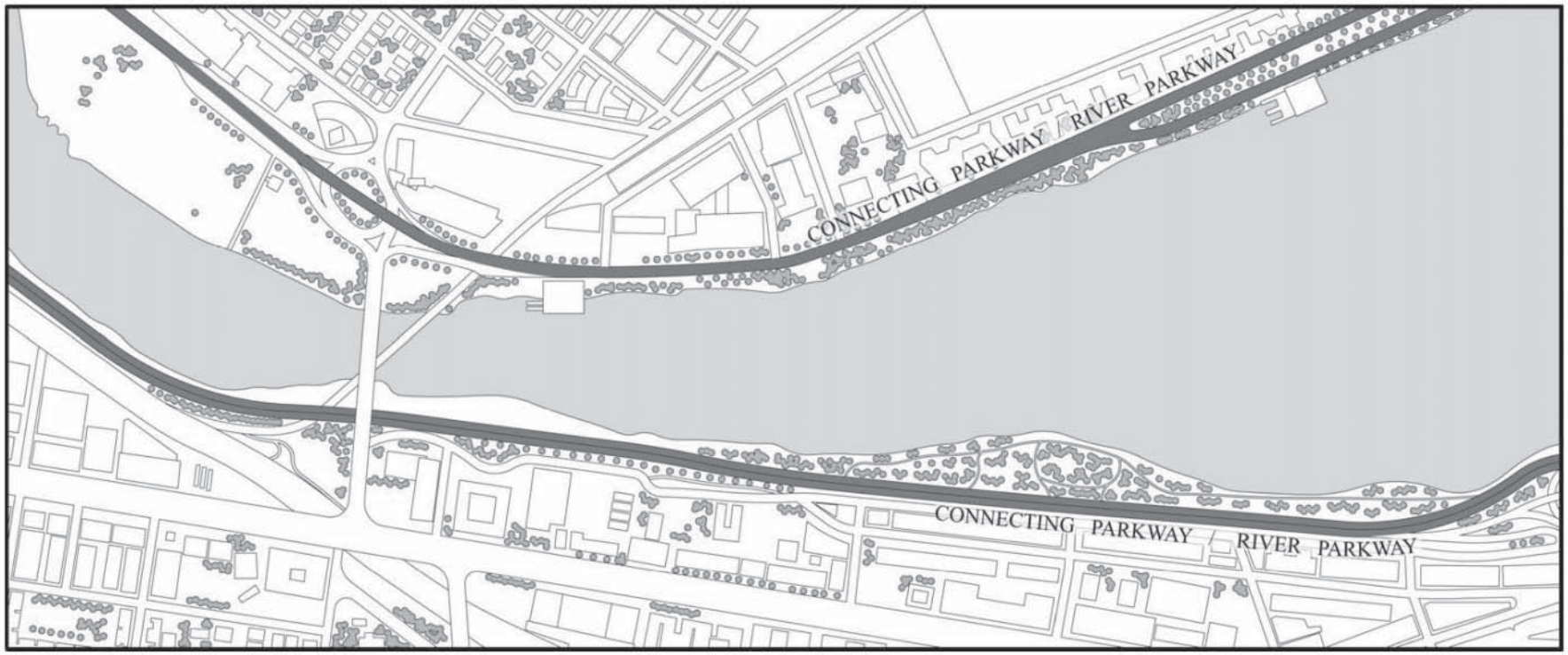
According to the MassHighway *Project Development & Design Guide,* basic design controls "serve as the foundation for establishing the physical form, safety, and functionality of the transportation facility." Context sensitive design includes consideration of the environment as a design control, one of many considerations that should be identified and documented early on in the parkway planning process. The Design Control Report for a historic parkway will include, at a minimum, documentation and assessment of Roadway Context, Roadway Users, and Transportation Demand and will serve as the guiding document during design. The DCR Project Team and the Design Team work closely to develop this document.

Context
The MHD *Guide* breaks up roadway context into three elements – Area type, Roadway Type and Access Controls. These concepts are easily translated into the historic parkway context, but their analysis requires a more comprehensive approach.

Area type
To define the Area Type for DCR parkways, a detailed analysis is necessary to insure the protection of natural and cultural resources. The parkway area type should be documented and assessed through a combination of a cultural landscape analysis, a natural resource inventory and analysis, and a review of regulatory parameters.

The context of every roadway includes its surrounding geography and adjacent development. In the case of parkways, the environmental context is particularly rich in significant natural and scenic resources. For example, Connecting Parkways such as the VFW Parkway and the West Roxbury Parkway link the world famous Arnold Arboretum to the Stony Brook Reservation. These significant open spaces establish the physical constraints of the roadway alignment and cross-section. They also influence the selection of motor vehicle design speed. Throughout this manual, the environmental context is generalized as **area type**.

The parkway roadways pass through three basic area types: urban, suburban, and rural. The following three plan diagrams illustrate the **area types** found along the three parkway types and the five parkway subtypes.



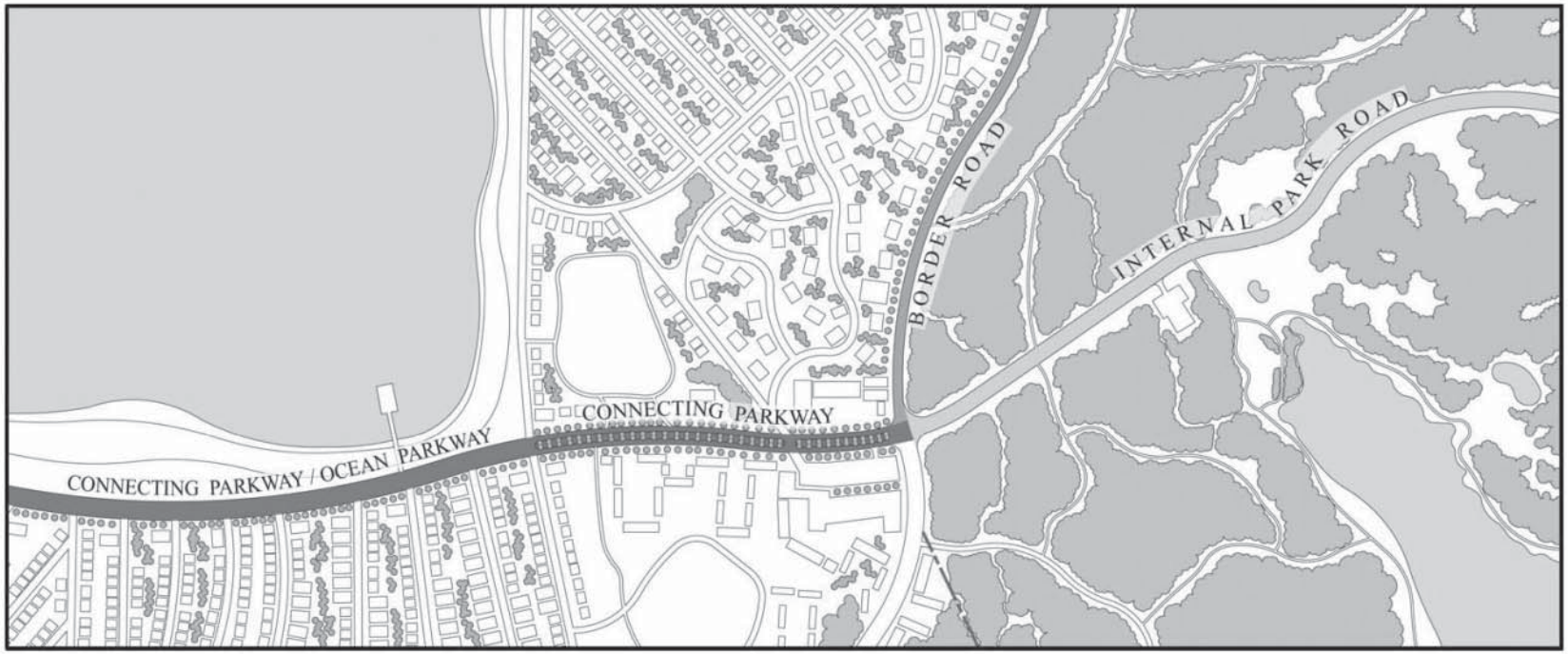
Urban Area Types

Urban Non Residential
The majority of development is mixed-use or commercial. The parkway roadway carries heavy traffic, sometimes accommodated by grade-separated intersections. Commuters may include bicyclists. Curb cuts are infrequent, although pedestrian crossings may be common. There is no street parking on parkway roadways. Parking is typically in large lots or structures.

Urban Residential/Institutional
Development is usually multi-family with institutions such as schools, colleges and hospitals, including mid-rise buildings, with shared curb cuts. There are high levels of pedestrian and bicycle activity.

In urban areas, most parkway roadways are restricted to pleasure vehicles only.

Urban Park
Parkway roadways define the edge of parkland corridors along rivers and brooks in areas otherwise densely built out. Additional parks are on individual parcels. Pedestrians and bicycle activity is heavy across and along the roadway, on sidewalks and trails. Driveways and curb cuts are infrequent



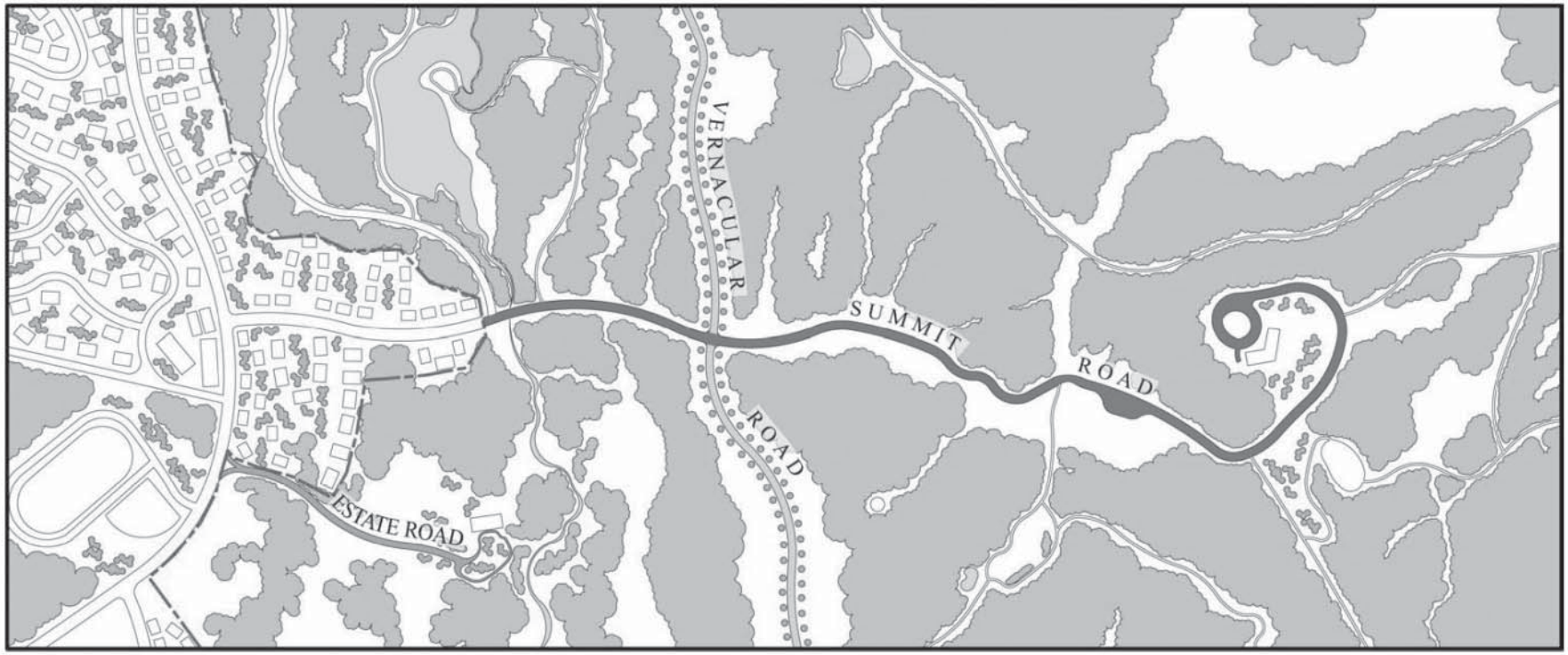
Suburban Area Types

High Density
These areas are substantially built out, have narrow residential lot frontage, and intensive development including commercial strip development. The Connecting or Ocean Parkway right of way is typically constricted, except where it borders parkland. Pedestrian and bicycle activity can be high-volume. Parking can occur on the roadway.

Town Center
These are pockets of commercial or institutional uses within a predominantly residential area. The Connecting Parkway right of way is constricted, with multiple curb cuts at commercial properties. Pedestrian and bicycle activity can be high-volume.

In suburban areas, some parkway roadways carry general traffic, including trucks and busses, instead of the usual restriction to pleasure vehicles.

Low Density
The Connecting Parkway may traverse a mix of undeveloped parcels and residential development of a lower density and longer frontage than in more built-out or commercial areas. It may border local open space such as playgrounds and golf courses. The parkway roadway continues as an Internal Park Road within extensive parkland that is typically a mixture of forest and wetlands. The roadway responds to topography, environmental, scenic, and historic resources. Parking can occur on the roadway. Pedestrian and bicycle activity is to be expected.



Rural Area Types

Village Development
Low density large-lot residential development predominates, with dispersed commercial and civic uses. Abandoned farmland is returning to forest. Future development may significantly change the rural character near the entrance to the parkland. Pedestrian and bicycle activity is low-volume. Parkway roadway traffic is generally pleasure vehicles.

Natural
The roadway traverses extensive parkland and responds to topography, environmental scenic and historic resources. Pedestrian and bicycle activity is low-volume but encouraged. The parkland may include Vernacular Roads such as abandoned town roads or designed Estate Roads showcasing landscaped grounds of a former private estate now within parkland. The Summit Road culminates in a landscape arrival overlook area.

This design control report should include the following sections:

Cultural Landscape Assessment
The historic background of the parkway, its character-defining features, its period of significance and available sources of research provide the context for later decisions related to landscape treatment, construction impacts and maintenance.

As defined by the National Park Service, a character-defining feature is "a prominent or distinctive aspect, quality, or characteristic of a cultural landscape that contributes significantly to its physical character. Land use patterns, vegetation, furnishings, decorative details and materials may be such features."[1] In other words, a character-defining feature is a visible aspect of the landscape that tells us about its history or contributes to the overall visual effect.

A landscape historian, preservation planner or archaeologist prepares the Cultural Landscape Assessment. The Assessment includes the following:

Historical documentation

- Relevant records from the Massachusetts Historical Commission (MHC) files; annual reports and planning reports of the managing agency, municipality or municipalities along the parkway, or the regional planning agency; plans, surveys and related engineering records including photographs from past construction projects in agency repositories; and newspaper articles and photographic collections in agency and historical archives.

- Historical status including listing on the state inventory, location within a local historic district, or listing on the National Register of Historic Places. Determination of eligibility for listing on the National Register (see Appendix E).

- MHC inventory form using methodology outlined in the MHC Historic Properties Manual if the property is not recorded or listed on the National Register. Document how the parkway fits in with others of its time period and the system within which it was created. The relationship of the parkway to its associated parkland and, in the case of Vernacular Roads that existed before the park, their pre-park function.

- Evolution of the parkway's role in the regional transportation system. Parkway change can be incremental, moderate or major due to adjacent development or pressures due to its function as an arterial.

- Parkway's "period of significance." For some parkways, the period of significance relates to park planning at the turn of the century, while others reflect modern notions of parkway design. The period of significance helps with such period specific decisions as selection of lighting.

- Archaeological features as appropriate. Assess likelihood of presence of Native American or later archeological resources and document known and likely locations of such resources.

Parkway Description – Existing Conditions

- Parkway segments, if needed, to name and locate distinctive experiences along parkways. For Summit Roads, areas of "descent" vs. "rest," hairpin turns and switchbacks are important. For Connecting Parkways, serpentine alignments with planted medians as well as undivided, open straightaways define character.

- Visual character of the roadway corridor, its setting, adjacent land uses and nearby development

- Significant scenic resources (consult Statewide Landscape Inventory, Heritage Landscape Inventory), significant views, positive and negative mid and long distance views, opportunities to open up desirable views or historic views lost over time and existing or potential scenic overlooks.

- Features worthy of protection for historic and scenic reasons, as well as treatments that have negatively impacted the parkway's historic character and integrity.

- Trees, rows or allées, adjacent woodland, shrubs, and grass or other groundcover, type and condition of growing environment (soft or hard surface, erosion and/or compaction), type and character of adjacent landscape.

- Location of significant geological and other features.

- Nature and level of use of the parkland or recreational destinations along the parkway such as trailheads, rinks and ball fields.

- Physical character and condition of buildings.

- Digital and/or aerial photography such as GIS orthophotos of current regional environmental, cultural, and land use context of the parkway.

- Identification of threats to the historic character of the parkway.

Character-Defining Features

- Parkway's extant character-defining features including alignment, travel lanes, sidewalks, pathways and structures.

- Changes to the original design over time, and how changed road width, adjacent development, or removal of vegetation have affected use, historic and visual character, and quality of experience.

- Relative status and significance of each character defining feature and the repositories of information researched (archives, DCR plan library, MHC files, CRI).

- Character-defining features listed on an Excel compatible spreadsheet and keyed into a site plan along with numbered photographs. The specific parkway elements to be addressed may include:

    - Roadway Alignment
    - Vistas from the Roadway
    - Interface of Roadway and Landscape Grading
    - Sidewalks and Pathways (pedestrian, bicycle, and/or non-motorized vehicle)
    - Shoulders
    - Lane Number and Width (including bicycle/parking lanes)
    - Pavement Markings
    - Road Surface
    - Median
    - Vegetation (Trees, shrubs, grass)
    - Curbs
    - Traffic Barriers (safety guardrails, fences, off-road access control, gates)
    - Walls (including retaining walls)
    - Utilities
    - Signage (safety, wayfinding, directional and interpretive)
    - Lighting
    - Bridges and Pedestrian overpasses
    - Underpasses
    - Access ramps
    - Intersections and Curb Cuts (traffic signals, rotaries, islands, rotaries, miters)
    - Drainage (roadway, culverts and swales)
    - Shade structures, overlook shelters, visitor contact stations, other user facilities.

Recommendations

- Overall parkway treatment based on historical research, existing conditions and project/management goals, the Design Team recommends the overall parkway treatment.

- The Design Team identifies any special considerations for treatment and call out any areas or features where a higher level of preservation or resource protection is recommended.

- The Design Team submits Draft and Final Cultural Landscape section for the Design Control Report with written and visual documentation such as photographs, illustrations and plans in a binder for easy reference.

Natural Resource Inventory

Historic parkways nestle comfortably into their setting because the roadways' horizontal and vertical alignments work with the topography and natural features. They also take advantage of scenic or dramatic views. Well-designed walls and bridges are visual assets as well as functional features. The original design protected natural resources. Consequently, analysis of existing conditions and inventory of natural resources are essential to the development of an appropriate treatment for the parkway. An ecologist or botanist with support from an arborist collects the following information for the inventory:

- Rare and endangered species of plants and animals as well as protected habitat.

- Wetlands and buffer zones (Determined need for an ANRAD).

- Regulated water resources, location within an aquifer recharge area and 100-year flood hazard area determination by the National Flood Insurance Program.

- Species and overall health of the vegetation within the parkway.

- Analysis of impact of project on significant or sensitive natural resources.

Definition of Regulatory Parameters
Protections on adjacent wetlands, historic or cultural resources are important to the parkway context. The Area Type section includes locations and descriptions of protected or regulated areas including:

- Wetlands including vernal pools
- Protected habitat shown on the Natural Heritage and Endangered Species Atlas
- Local historic districts, State and National Register listed properties
- Areas of high archaeological sensitivity
- ACEC, Scenic Byway or other state and federal designations

The Design Control Report also lists contact information for regulating agencies and commissions along with meeting schedules.

Parkway type (Roadway Type)
In the MassHighway *Project Development & Design Guide*, the roadway type is what is traditionally known as the functional classification. DCR parkways represent the broad spectrum of functional classes, but because the parkway serves recreational needs as well as providing transportation, the roadway type must represent more than traffic function. The roadway type for historic parkways is therefore considered to be its parkway type – Connecting Parkway, Internal Park Road or Border Road. Comparable Green Book classifications are listed below.

Primary Type Secondary Type	**AASHTOGreen Book comparable classification**
Connecting Parkway	Arterial or Collector
River Parkway	
Ocean Parkway	
Internal Park Road	**Local**
Summit Road	Local
Estate Road	Local or Rec. Trail
Vernacular Road	Local or Rec. Trail
Border Road	**Collector**

Design treatments for historic parkways should begin with the premise that the parkway type will be maintained as a primary design control.

Access Control

MHD defines access control as "a term used to define how access to adjacent properties is regulated and designed along a roadway. Access control is one of the most useful tools available to maintain safe and efficient roadway operations for all users." On DCR parkways, traffic is either restricted (Pleasure Vehicles Only) or unrestricted (General Traffic). The presence of a median and the frequency and type of curb cuts also play a role in access control. Although many of these features are documented in the Existing Conditions report, the consultant should prepare a summary of Access Controls in this section of the Design Control Report.

Access Control defines how access to adjacent properties is regulated and designed along a roadway. Vehicular access affects parkway character the most. Limited access control was an important parameter in the historic design of parkways both to enhance resource protection, the recreational experience, and to enhance safety. Access control continues to be a useful tool in maintaining safe roadways for parkway users. The **area type** and **parkway type** will influence the degree of access control.[1]

Most Connecting Parkways were designed without access to abutting private property, except by permit control, and with restricted intersections with the local street network. Border Roads separate parkland from private development while allowing access by abutters. Internal Park Roads located do not provide access to adjacent private or institutional property.

Most parkways were originally designed to accommodate pleasure vehicles in dedicated travelways, although some were designated for general traffic by legislation. Pleasure vehicles initially meant carriages and bicycles, later meant private automobiles for leisure travel and subsequently included commuters. General Traffic included trucks, commercial vehicles and busses. Truck and bus access was controlled by regulation and indicated by signage reading, "pleasure vehicles only." Some parkways were reconstructed to include separate service roads open to general traffic. See Appendix G for a listing of the traffic restrictions on DCR parkways.

New curb cuts, permits for truck use and other access requests are managed through DCR's Permits Section within the Division of Planning & Engineering.

The Design Control report documents and assesses the existing Access Controls on the subject parkway, including medians, curb cuts and traffic restrictions as well as recommendations for maintaining, increasing or regulating such controls.

Roadway Users

From the beginnings of parkway design, with Frederick Law Olmsted's parkway systems in Buffalo and New York City, the express intention for these linear parks was to accommodate "the triple purposes of delight, recreation and circulation"[2] . This legacy of accommodating multiple use—transportation and recreation—sets parkways apart from highways. Highways were not designed first and foremost to connect and move through parks, to afford views of beautiful scenery and to support linear recreation and transportation in many modes.

The composition and characteristics of parkway users is an important control that influences the parkway treatment. This design control category captures the importance of accommodating recreational users, specifically:

- Pedestrians
- Cyclists
- Other recreational users

The first two groups have been parkway users from the beginning and continue to be active participants. Equestrians, also original users, still ride in areas with substantial and contiguous off-roadway trail networks, typically Internal Park Roads. Runners and rollerbladers are more recent users.

Pedestrians

Throughout the Commonwealth, people stroll and enjoy long walks through the parkways' attractive natural surroundings. Recreational preferences now include running and jogging as well. Connecting Parkways sometimes provide a dedicated pathway in the park separated from the roadway. Ocean Parkways invariably provide an ocean side promenade. River Parkways are popular places for runners and bicyclists, sometimes sharing pathways close to the roadway. Border Roads have a sidewalk on the side of the roadway across from the parkland. On Internal Park Roads, Summit Roads and Estate Roads, pedestrians, hikers and runners share the roadway with vehicles, since the low level of vehicular traffic does not justify a dedicated off-road pathway. Independent trails meet the roadway at crosswalks and trailheads.

Pedestrians require a certain amount of physical space to maneuver comfortably. They need connections and safe crossings between destinations. The Transportation Research Board's *Highway Capacity Manual* (2000) provides methodologies for evaluating how a pathway serves the demand placed on it and how wide the sidewalk should be given the demand. Space requirements are also influenced by the characteristics of wheelchairs users or people with canes. The Design Team reviews these requirements within the historic context.

Cyclists

The large constituency of recreational and commuter cycling, particularly in urban areas, justifies improvements to bicycle accommodation and safety. When cyclists, roller bladers and pedestrians share a pathway, the pathway is not always conducive to comfortable or safe use by any of the groups.

Safe, convenient and well–designed facilities will encourage bicycle use. Conditions and constraints on different parkways dictate whether a bicycle lane, roadway bicycle route or shared use pathway is most appropriate.

Other Recreational Users

Connecting Parkways and Border Roads often provide access to active recreational facilities such as swimming pools and hockey rinks. Siting such facilities on parkways is no longer considered appropriate.

Some parkways have overlooks and shelters. River Parkways have launches for canoes and other small boats, and Ocean Parkways abut beaches. Internal Park Roads have vistas, hiking and horseback riding trails, wildlife observation, campgrounds, and picnic areas.

Recreation users require parking. Widening the roadway to provide parking can block views, particularly on River and Ocean Parkways, and can dilutes the experience of the natural corridor. Informal parking degrades the road edge. Parking needs to be studied and documented.

A random survey conducted in 1995 found that 95% of park visitors in Massachusetts want to learn about the natural and cultural history of the site. Telling the story of the parkways' cultural and environmental significance is an educational opportunity. For example, interpretation of Ocean Parkways can tell the story of the parkway's past and inform the public about coastal erosion. Teachers in nearby schools may wish to use a parkway for outdoor education.

The Design Control Report documents the parkway user types, frequency of use, types of pathways, etc. along with recommendations to maintain, adapt or regulate such uses.

Transportation Demand

Transportation demand, volume, composition and patterns are important design controls. The parkway's original design choices—number of travel lanes, auxiliary lanes, sidewalks, and pathways—affect their capacity. In the early development of the parkways, accommodation for a variety of trip types and a variety of users was an important consideration, as it is today.

In highway projects, the Design Team selects a *design year* on which to base any rehabilitation and restoration, or new project and evaluates a typical project for a design year defined as twenty years in the future. It establishes estimates of pedestrian, bicycle (and other non-motorized vehicle), and motorized vehicular traffic for peak hour travel times in the design year. It balances uses and accommodates pedestrians and bicyclists. For historic parkway projects, the Design Team considers other issues and looks at *design year* in a different light. The team documents the following in the Design Control Report:

- Use and function of the roadway and the roadway's role in the regional transportation network.

- Physical character and condition of the roadway, including horizontal and vertical alignment, sight distance, posted speed limit, barriers, traffic controls, side slopes and lighting.

- Capacity

    - Assess the parkway's traffic capacity, level of service, and other measures of effectiveness for the design hour conditions of the preferred parkway configuration as established in the Cultural Landscape Assessment in the Design Control Report. For example, if the parkway was designed with two lanes in each direction, its capacity is defined as the amount of traffic that can be safely accommodated by these two lanes.

    - In areas where excess roadway capacity exists, examine ways to restore parkland or accommodate bicyclists.

    - In areas where roadway capacity accommodates roadway demand, examine ways to improve safety and maximize multimodal opportunities.

    - In areas where the parkway is expected to operate over capacity, determine the traffic and safety implications of the congested condition on the parkway and parallel corridors. Determine specific design elements that will improve capacity and reduce congestion, especially where improved capacity in one area may result in the ability to restore parkland in another area.

- Analysis of traffic conditions

    - Review existing peak hour and daily vehicle volume and classification counts, including pedestrian, bicycle, and other non motorized vehicle volumes

    - Review summary of accident frequency and rates for a minimum three year period, and comparison of rates to statewide and/or area wide averages.

- Perform a safety evaluation based on available accident and safety data. Use the data to calculate accident rates and frequency throughout the parkway corridor. Identify any potential safety deficiencies, and develop strategies to eliminate these deficiencies and improve safety throughout the corridor.

- Determine Parkway status with respect to the National Highway System (NHS) and implications for treatment

- Recommendation of transportation demand control

    - Determine design hour traffic, truck, pedestrian and bicycle volumes for a 20-year design horizon (10-years may be adequate for minor projects)

    - Set parkway design speed based on procedures outlined in the Guidelines section and the MassHighway *Project Development & Design Guide*

    - Establish specific design criteria selected for lane and shoulder widths, curb type, barriers, clear zones, and other controlling criteria

    - Conduct engineering studies as needed to support drainage, geotechnical, structural, electrical or other design elements.

    - Evaluate relative significance of the above issues and describe the recommended specific list of controls to guide management and treatment decisions.

    - Document features by type, description, condition, and cause of problems when able to be determined by visual inspection.

Measures of Effectiveness

Throughout the design process, the Design Team evaluates the parkway treatment using several measures of effectiveness. MassHighway's *Project Development and Design Guide* suggests methods of effectiveness and analysis tasks for the Design Team's consideration. Their contextual Measures of Effectiveness are particularly helpful.

Design Speed

In parkways that follow the topography, safe travel speeds are limited by horizontal curvature, roadway centerline profile, sight distance, total roadway and travel lane width, and roadside friction (any features in close proximity to the travel lane), all of which are influenced by the surrounding landscape. Speed and the physical characteristics of the parkway are interrelated. Many design elements are directly related to speed. Once the appropriate speed is selected, the Design Team tailors design elements to that speed.

- For any parkway rehabilitation or new parkway project, establish the *target speed* (the desired operating speed) and the *design speed*, which will govern many of the critical defining geometric elements of the parkway corridor. When selecting the target speed and design speed, follow the principles outlined in the MassHighway *Project Development & Design Guide*, and the AASHTO's *A Policy on Geometric Design of Highways and Streets*,

- In the selection of the appropriate target speed and design speed, take into account the following:

    - The context of the existing parkway
    - Existing posted speed limits, if applicable
    - Existing operating speeds at representative points along the roadway
    - Accident history and safety evaluation
    - Existing sight lines and other design constraints based on the horizontal and vertical alignment and cross section elements
    - Design year traffic and vehicle composition, and
    - Planned use of the parkway corridor.

Once the Design Team selects an appropriate target speed and design speed, it can develop parkway design elements that reflect and reinforce the desired speed. For example, a parkway that was reconstructed with wider lanes and a straighter alignment may benefit by reestablishing narrower lanes and/or a curvilinear alignment as long as it is historically appropriate and maintains or improves safety for parkway users.

Sight Distance
Sight distance is the length of the roadway ahead that is visible to the roadway user. Sight distance is related to the design speed of the roadway. On parkways, a character-defining feature on the roadside that potentially blocks the view around a horizontal curve may be too significant to be removed simply to achieve a current standard of sight distance. There may be cases where reduced sight distance, with its implications for speed and other safety measures, is a design control. The Design Controls will include determination of the appropriate sight distance.

Now that the basis for the design has been established, the design phase can begin.

DESIGN
The Design Phase consists of three phases: (1) schematic design, (2) design development and (3) final design. DCR reviews the project at the schematic design (20%), design development (50%), and final design stages (100%). Each design phase should be paralleled by a public process to garner community support, field local concerns and ultimately build a better project. Regulatory compliance may also require consultation, preliminary permit applications or other filings during early design phases as well.

DCR either reviews submittals of contract documents prepared by an independent consultant or actually prepares the contract documents for smaller jobs in house. See Appendix M for a sample project scope of work for the independent consultant. The independent consultant may consist of a team of disciplines that typically produce construction documents, such as landscape architecture and transportation design (the Design Team in this section). The DCR Project Team works to meet project schedules for start of construction. The primary objective of the Design Phase is to produce a quality set of contract documents ready for bid that meets all criteria for the project.

Working with the DCR Project Team and Design Team, the Project Manager expedites the development of complete and accurate working drawings and specifications. Acting as DCR's representative, the Project Manager assures that appropriate approvals and information are completed on time, coordinates the Project Team, project budgeting and tracking, preparation and approval of necessary permit applications and public participation and information.

Schematic Design Phase

Once the Design Control Report is complete, the Design Team compares the parkway's history with its current conditions to understand what has changed and what exists of a particular historic period.

The team completes measured drawings of existing architectural and structural features; site survey including topography, vegetation and site utilities; soils investigations; modified historic structures report; environmental data collection; and any other surveys needed to document existing site conditions.

The team analyzes existing conditions and evaluates the data gathered to understand the issues and opportunities that need to be addressed in the parkway treatment. The team then prepares a site analysis and develops one or more conceptual designs and preliminary estimates of probable costs for these alternatives for review by the Project Team.

Public Meeting #1
The Project Team then meets with the community to understand how its members see the project. The team delineates the project area, shows photographs of existing conditions, presents a site analysis and discusses opportunities for change.

Environmental Review and Permitting Requirements
When a parkway project might impact wetlands, endangered species habitats, historic/ archaeological resources other protected areas (ie. ACEC), environmental permitting is necessary. Local, state and federal permits for DCR projects must be obtained before a project is publicly advertised for bid.

The Design Control Report should have included an assessment of regulatory parameters, filing requirements and contact information. This section should be referenced during the early design phase to determine the trajectories for various reviews and permit approvals. The List of Common Regulatory

Thresholds in Appendix J is also a helpful tool in identifying the necessary permits.

It is also important to foster positive communication with permitting agencies at the project's outset and to become familiar with their procedures and regulatory scopes. Some agencies include the Department of Fisheries and Wildlife's Natural Heritage and Endangered Species Program, the Massachusetts Historical Commission and the Department of Environmental Protection (DEP) .

Public Meeting #2
The Design Team presents cost effective alternatives that meet the project's program, minimize environmental impact, meet the DCR's design objectives and are consistent with the Design Controls established for the project. The team presents these designs to the public for feedback. The team explains data used to prepare the alternatives such as traffic counts and design criteria. The team presents plans and sections of the alternatives.

Preferred Schematic Design Alternative
The Design Team then prepares layout plans, elevations, cross sections, key details, outline specifications, narrative description, and outline cost estimate for the preferred alternative for review and approval of the Project Team. Upon written approval of the schematic design by the Project Manager's supervisor, the project enters the Design Development phase.

Design Development Phase
During this Phase, the design team refines the design and selects materials, equipment, finishes and plantings in preparation for starting working drawings. The design team prepares, from the approved Schematic Design, drawings, sections, elevations and details to fix and describe the size and character of the entire project as to site, structural, mechanical and electrical systems, materials and storm water management.

Public Meeting #3
The team presents the preferred alternative refined during design development to the public for feedback. The team presents additional drawings and sections of the preferred alternative.

The design team then prepares preliminary specifications for all the items of work and materials that as completely as possible reflect the preliminary drawings for the project. Upon completion of these drawings and specifications, an independent cost estimator prepares an estimate of probable cost. The designer updates the schedule for obtaining all local, state and federal approvals during the Final Design stage of the project.

The DCR Project Team reviews the design development submission to assure that the program and design decisions are adhered to and that the budget and schedule remain intact. Upon review and approval of the design development submission by the Project Team it is submitted to the Project Manager's supervisor for approval.

Final Design Phase
During this phase, the design team completes contract documents in sufficient detail to permit firm

bids in open competition and a detailed estimate of probable cost. Final Design documents are prepared in accordance with Chapter 30 for public works projects and Chapter 149 for building projects over $100,000 in value. The design team, based on the approved design development drawings and outline specifications, prepares and revises, until they are satisfactory to the DCR Project Team, complete working drawings and detailed specifications describing all materials and methods of work in conformity with the DCR's Description of Site Design Services for Chapter 30 Public Works Projects, or DCAM Form 9 for Chapter 149 building projects.

During this phase, the design team completes permit applications for all necessary local, state and federal approvals. All Conservation Commission, DEP and MEPA submissions must be coordinated with the Environmental Review and Compliance Section. Project Notification Forms for projects affecting archaeological or historical resources are prepared and filed by DCR's Office of Cultural Resources.

Public Meeting #4
The fourth public meeting is held after the project has been out to bid to inform the public about the construction schedule.